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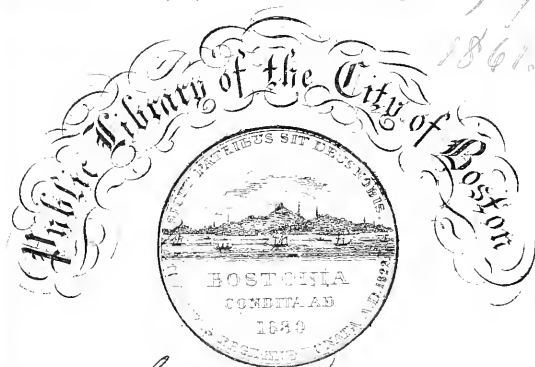
ANNUAL REPORT
OF THE
COCHITUATE WATER BOARD
FOR
1861.



PRESENTED TO THE

6357

1861



By City of Boston.

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CITY OF BOSTON.



REPORT
OF THE
COCHITUATE WATER BOARD
TO THE
CITY COUNCIL OF BOSTON,
FOR THE YEAR 1861.



City of Boston, Oct. 28, 1868.

Wm. Lloyd Garrison

CITY OF BOSTON.

In Common Council, January 9, 1862.

ORDERED: That the Cochituate Water Board be authorized to make their Annual Report in print.

Sent up for concurrence.

JOSHUA D. BALL, *President*.

In Board of Aldermen, January 13, 1862.

Concurred.

THOMAS P. RICH, *Chairman*.

Approved.

J. M. WIGHTMAN, *Mayor*.

REPORT.

OFFICE OF THE COCHITUATE WATER BOARD, }
Boston, January 15, 1862. }

TO THE CITY COUNCIL:

THE Cochituate Water Board, in submitting to the City Council their Annual Report for the year 1861, regard it as a matter of congratulation that the Works are in a safe and efficient condition; that the various subordinate officers connected with the administration of this important department have been faithful in the discharge of their respective duties; and that the quantity and quality of water supplied to the citizens have been entirely satisfactory.

The expenditures and receipts on account of the Water Works to January 1, 1862, may be stated as follows:—

Amounts paid by the original Commissioners, and by the Water Boards from the time the Works came under the control of the latter . . . \$5,580,860 64

Sundry payments by the City and dis-
count and interest on loans, 3,682,295 65

Amount carried forward, \$9,263,156 29

<i>Amount brought forward,</i>	\$9,263,156	29
From which there should be deducted		
sundry credits by the city, and		
amounts received for Water rates .	3,138,835	65
	<u>\$6,124,320</u>	<u>64</u>

Leaving the actual cost of the Works on January 1, 1862, the sum of \$6,124,320.64.

The receipts for Water used in the year 1861 was \$342,138.75, being an increase over the income of the previous year of more than thirty thousand dollars, and being about five and one half per cent. on the cost of the Works, as above stated.

The assessments for the year 1862, payable in January, amount to \$298,755.19.

The estimated amount of income from sales of Water during the year 1862, is \$375,000.00.

By reference to the Report of the Clerk, hereto annexed, it will be seen that there has been drawn from the treasury by the Board, during the year, the sum of \$73,977 29

Of this, there was drawn for

the new main pipe,	\$334	76
For raising the pipes on Tremont and Dover Streets,	601	50
For laying pipe in Beacon Street	506	78
For extension of the Works	<u>38,615</u>	<u>50</u>
Leaving as the ordinary expenses of the year		<u>\$33,918</u>
		75

The increase of expense for the year was caused by repairs upon the line of pipe to East Boston, and upon Beacon Hill Reservoir, which together amounted to the sum of \$4,200.

The embankments, culverts, waste weirs, and bridges connected with the aqueduct in the Western Division, have all been thoroughly repaired during the year, and are now in good condition.

The Superintendent of this Division has several times thoroughly examined the interior of the aqueduct, and on one occasion was accompanied by members of the Board.

In August last the interior received a thorough cleansing throughout its whole extent. No new cracks were discovered, but the Superintendent reports that some of the old ones have enlarged. One in Brighton will require particular attention, but it is obvious that repairs of this sort are attended with great difficulty, as the Brookline Reservoir is not large enough to keep the City supplied while the water is shut off from the aqueduct for the purpose of repairing the same.

The Superintendent of the Eastern Division has presented his Annual Report, which is annexed. The usual amount of iron pipe has not been laid in this division, owing to the limited amount of building in the city, while the repairs have been more than usual. At Chelsea Creek it was discovered that the worms had destroyed the woodwork that supports the pipes, to a considerable extent, and immediate repairs were deemed necessary, and were made. At Warren Bridge a new

outside fender has been put on the entire length, and made secure.

Repairs on the Beacon Hill Reservoir were commenced, but have been postponed on account of the difficulty of procuring cement. They will probably be resumed in the spring.

The aggregate length of pipes laid from the commencement of the Works, to January 1, 1862, is over one hundred and thirty-one miles.

The line of pipe to East Boston has been repaired. The bridges and the box across the creek between Chelsea and East Boston were very much decayed, and the Board desire to call particular attention to the subject of the East Boston supply. If this pipe across the creek should give out from any cause, the citizens of this portion of the city would be wholly deprived of water, for the pipe which is under water cannot be repaired. We recommend the laying of another pipe across Meridian Street bridge, of a larger size than the present one.

By the Act of the Legislature of this Commonwealth of 1860, (ch. 184,) the City was authorized to raise the dam at the outlet of Lake Cochituate to the height of ¹⁰~~two~~ feet above the floor of Knight's flume (so called). In accordance with this Act the dam was raised, and in the judgment of this Board, we have now reached the greatest capacity of Lake Cochituate for the supply of water. In case the supply is insufficient, recourse should be had to other sources, which may or may not be connected with this lake.

To raise the lake any higher will require legisla-

tive action, and would be attended with such expense, and with difficulties so great and so numerous that the Board are decidedly of the opinion that it will be a mistaken policy to attempt it.

The Board have visited the lake and made a careful examination, with the view of obtaining more water; and after the most careful consideration of the whole subject, decided to connect Dudley Pond with the lake by an iron pipe about eight hundred feet in length. It was thought that a portion of the distance could be tunnelled, but upon examination this was found impossible, there being so much coarse gravel; and it was found necessary to dig a trench, the deepest part of which is sixty feet. The estimated cost of this connection is less than \$14,000.

With this addition to the source of supply there ought to be water enough for this City without any additional expense, and the Board are confident there would be, were it not for the wasteful use of the water in the city. This has been a topic of discussion in the various Water Reports for several years. The present Board have adopted energetic measures, by the aid of the police, in preventing this evil, and these measures have been attended with marked success. At the same time, the only efficient remedy must be found in the citizens themselves in the use of water, and in giving information of any wasteful use by others, or by the general adoption throughout the city of water-meters, and an entire change in the assessment and collection of water rates.

The Board are satisfied that some methods of using

the water, heretofore allowed, are highly objectionable, and should be changed at once. One of these is the use of hopper water-closets. In order to test this manner of using the water, a meter was attached to a pipe that supplied five hopper water-closets at the Boston and Maine Railroad station, and in twenty-two days the meter indicated 543,187 gallons as the quantity consumed, or 24,690 gallons per day, which, at the tariff-rate of two cents for each one hundred gallons per day for three hundred and sixty-five days, would amount to \$1,802.37. The amount actually charged in the tariff now adopted for five hopper closets, in 1861, was \$25!

The Board have not hesitated to adopt a rule that no more water shall be supplied to hopper closets made on and after January 1, 1862.

The Board also caused two meters to be attached to the factory of Messrs. Grover & Baker, with the following results: In thirty-five days, the meter that supplied the engine of twenty-eight horse-power consumed 124,657 gallons, or 3,561 gallons per day, which, at the tariff-rate of two cents for each one hundred gallons for one year, amounts to \$213.66. The amount paid for this engine in 1861 was \$217.76.

The meter that supplied nine water-closets and six sinks, in the same establishment, indicated in thirty-five days, 698,565 gallons to have been used, or 19,959 gallons per day, which, at the tariff-rate of two cents for each one hundred gallons for one year, amounts to \$1,197.36. The amount actually paid for these closets and sinks for the year 1861, was \$80!

A meter was placed during the year in the house of the President of the Board, in Chestnut Street. The family consisted on an average of six persons, and the quantity of water used was the same as before the meter was placed there; that is, no change was intentionally made in this respect. The result was, that for two hundred and forty-five days the quantity of water used was 20,670 gallons,—an average of eighty-four gallons per day, or 30,660 per annum, which, at the tariff-rate of six cents per one hundred gallons, amounts to \$18.39. The rate charged and paid for this house was \$21. From which it appears that the occupant actually paid more by the rate than he would have paid by actual measurement.

These results speak for themselves, and show that some radical change in this enormous disparity between the amount of water used, and paid for, is desirable; and it is quite certain that the most just, satisfactory, and equitable method of charging for the water, would be by actual measurement, so that each citizen may pay for just the quantity he uses. Hence many are ready to advocate the immediate introduction of water-meters over the whole city. Perhaps this may be the result in time. But there are practical difficulties in this matter that deserve serious consideration before any such radical change is made; and such a plan would require the expenditure of something like half a million of dollars at the present cost of water-meters. In certain cases, however, where a measurement of water seemed absolutely indispensable, the Board have caused meters to be introduced; and during the year they have procured forty-two meters,

and have expended about three thousand dollars for this purpose.

The Board are happy to be able to state that the change which was made in the tariff in regard to hotels, has been sustained by a decree of great importance, made by the Supreme Judicial Court. The case was brought before the Court by the proprietor of the Parker House, in a bill in equity to restrain the City of Boston from cutting off the supply of Cochituate Water therefrom, or otherwise enforcing against the plaintiffs the water rates assessed upon them in the year 1859. The facts in the case were, that, under the provisions of the City Ordinance, the Water Board and Registrar put into a portion of the hotels of the city, including that of the plaintiffs', a water-meter, for the purpose of determining the quantity of water used therein; that the water used in plaintiffs' hotel exceeded ten thousand gallons a day; and the Water Registrar, under the direction of the Water Board, made an assessment thereon, for the quarter ending December 31, 1859, at the rate of two cents for each one hundred gallons; that the amount of the assessment so made was \$206.19; while, if made according to the provisions of the City Ordinance, applicable to hotels into which no meters have been put, it would have been only \$57.40, and that the plaintiffs were notified, December 27, 1859, that unless the amount assessed was paid within three days the water would be cut off.

The counsel for the plaintiffs contended — 1. That the power to fix the price and rents of water was in the City Council alone, and could not be delegated to

the Water Board or any other city officer. 2. That the citizens using water had a right to have the judgment and discretion of the City Council upon the price to be paid. 3. If the Ordinances were otherwise within the authority of the City Council, they were uncertain, unreasonable, and therefore void. 4. But the plaintiffs were charged several times as much under these provisions as under the price fixed by the City Council. 5. Hotelkeepers using the same quantity might, under these provisions, be charged at rates differing as one to four, at the will of the Water Board or Water Registrar. 6. Even if the Ordinance was valid, this specific water rate should have been assessed by the Registrar, and not by the Water Board. 7. It should have been assessed on the last of January, for the year, and not quarterly.

In the elaborate opinion of the Court, all these points were overruled, and it was decided, that upon a proper interpretation of the provisions of the statutes and ordinances bearing upon the subject, none of the objections urged by the plaintiffs against the proceedings of the Water Board in fixing the price or rent to be paid for water taken by them, could be sanctioned. Judgment was accordingly rendered for the City. As this was a test case, the other hotel proprietors who had refused to pay the rates assessed, subsequently paid them, amounting to \$9,526.50.

In concluding this Report, the Board desire to call attention to a subject which has been alluded to in former Reports, and that is the annexation of more territory to the limits of the city. Of course this Board

have no right to refer to this subject in any other point of view than the one affecting the *water supply*. They believe the present Water Works are sufficient to supply the present limits of this city and any population we are likely to have within our present territory ; but there will not be sufficient for the people in case other cities should be annexed ; and, in such an event, it will be indispensable to look to other sources of supply.

It will be false economy and a great municipal error to obtain more service from the present Works than they will bear. They have been constructed with the view of performing a certain amount of supply. If an attempt is made to increase this amount, it will certainly be attended by a disarrangement of the system, and to constant difficulties which may seriously impair the whole character of the Works. It will be far more economical for the citizens in case more territory is annexed, to consider at the same time what measures be taken for a further supply of water, than it will be to impair a system which now works to general satisfaction, and which is believed to be as good as any in the world.

All of which is respectfully submitted.

EBENEZER JOHNSON, *President*.
SAMUEL HALL,
SAMUEL HATCH,
GEORGE P. FRENCH,
JABEZ FREDERICK,
GEORGE DENNIE,
L. MILES STANDISH.

RECEIPTS AND EXPENDITURES.

*Statement of Expenditures made by the Cochituate Water Board, from
December 31, 1860, to January 1, 1862.*

Laying service pipe	\$ 5 50
Pipe yard, painting buildings, &c.	52 19
Taxes	218 59
Fountains	303 98
Stationery, (including stationery for Water Register and Superintendents)	189 79
Damage to drains, in streets, &c.	193 02
Oil	159 80
Printing, (including Water Registrar's and Superin- tendent's)	526 64
Miscellaneous expense, flowing skating grounds, pond on Public Garden, plans, &c., and expense of the Board	560 98
New main pipe, cost of	304,991 83
Deduct previous payments	304,657 07
	334 76
Repairing main pipe	3,287 95
Aqueduct repairs	1,862 45
Lake, raising lower dam and other repairs,	1,551 18
Paid on account of connecting Dudley Pond with the lake	2,757 02
	4,308 20
<i>Amount carried forward,</i>	\$ 12,003 85

<i>Amount brought forward,</i>	\$ 12,003 85
Repairing service pipe	2,094 40
Repairing streets	2,357 63
Repairing hydrants	2,102 50
Salaries	8,405 33
Office expenses	1,758 05
Off and on water	2,848 76
Wages proving yard	1,801 81
Wages plumbing shop	502 25
Wages blacksmith shop	776 48
Wages laying main pipe	2,993 63
Wages laying service pipe	2,729 97
Beacon Hill Reservoir, for labor, &c.	1,900 14
South Boston Reservoir, for labor, &c.. . . .	97 24
East Boston Reservoir, for labor, &c.	207 64
Brookline Reservoir, for labor, &c.	712 45
Service pipe	8,007 83
Main pipe	11,491 63
Stable	533 81
Laying main pipe, for stock, &c.	1,327 79
Blacksmith shop, for stock, &c.	118 35
Hydrant and stop-cock boxes	648 93
Repairing stop-cocks	1,156 60
Travelling expenses	344 53
Tolls and ferriage	140 03
Postage and express	38 34
Tools	540 67
Raising water pipes, on Tremont and Dover Streets	17,999 76
Deduct previous payments	<u>17,398 26</u>
	601 50
Carting	146 00
Hydrants	722 06
Proving yard, for stock, &c.	957 76
Stop-cocks	<u>955 11</u>
<i>Amount carried forward,</i>	\$ 71,023 07

<i>Amount brought forward,</i>	\$ 71,023 07
Laying main pipe, on Beacon Street	4,998 05
Deduct previous payments	<u>4,491 27</u>
	506 78
Rents, for tool chest	39 00
Meters	<u>2,408 44</u>
	73,977 29
Less this amount drawn for new main	334 76
Less this amount drawn for raising pipe on Tremont and Dover Streets	601 50
Less this amount drawn for laying pipe on Beacon Street	<u>506 78</u>
	1,443 04
	<u>72,534 25</u>

CASH PAID CITY TREASURER.

Received rent for Arches under Beacon Hill Reser- voir	300 00
Received for account of land sold	130 00
“ “ wood, \$ 87 ; grass and pasture, \$ 81	168 00
Received for old wagon	7 00
“ “ Main pipe and laying (for Fire Department, &c.) service pipe and laying, repairing, &c., &c.	7,228 36
Received for off and on water for re- pairs	1,434 75
Received for off and on water for waste and fines	1,350 00
Received for off and on water for non-payment	<u>1,431 50</u>
	4,216 25
Less this amount for non-pay- ment, which was paid City Treasurer	<u>1,431 50</u>
	2,784 75
	<u>10,618 11</u>
Balance	\$ 61,916 14

Amount of expenditures \$72,534 25

EXTENSION OF THE WORK.

Oil	\$ 159 80
Laying service pipe	5 50
Wages, proving yard	1,801 81
Wages, plumbing shop	360 00
Wages, blacksmith shop	550 00
Wages, laying main pipe	2,993 63
Wages, laying service pipe	2,729 97
Service pipe	8,007 83
Main pipe	11,491 63
Stable	350 00
Laying main pipe	1,327 79
Blacksmith shop, stock, &c.	118 35
Hydrant and stop-cock boxes	200 00
Tolls and ferriage	65 00
Tools	150 00
Carting	120 00
Hydrants	722 06
Proving yard	800 00
Stop-cocks	955 11
Meters	1,800 00
Lake, Dudley Pond	\$2,757.02
Lower dam, &c.	950.00
	<hr/>
	3,707 02
Aqueduct repairs	200 00
	<hr/>
	38,615 50
Amount of annual expense	\$33,918 75

*Expenditures and Receipts on account of the Water Works, to
January 1, 1862.*

Amount drawn by the Commissioners	.	.	\$4,043,718	21
“ “ “ Water Board, 1850	.		366,163	89
“ “ “ “ “ 1851	.		141,309	23
“ “ “ “ “ 1852	.		89,654	20
“ “ “ “ “ 1853	.		89,854	03
“ “ “ “ “ 1854	.		80,182	35
“ “ “ “ “ 1855	.		63,866	33
“ “ “ “ “ 1856	.		81,429	35
“ “ “ “ “ 1857	.		96,631	25
“ “ “ “ “ 1858	.		76,006	01
“ “ “ “ “ 1859	.		385,652	47
“ “ “ “ “ 1860	.		146,304	55
“ “ “ “ “ 1861	.		73,977	29
			<u>5,735,049</u>	16

Amount paid the City Treasurer				
by the Commissioners	.		\$47,648	38
Am't paid by Water Board, 1850,			8,153	52
“ “ “ “ 1851,			5,232	38
“ “ “ “ 1852,			15,869	12
“ “ “ “ 1853,			4,621	40
“ “ “ “ 1854,			12,423	29
“ “ “ “ 1855,			9,990	38
“ “ “ “ 1856,			7,840	43
“ “ “ “ 1857,			13,750	00
“ “ “ “ 1858,			9,200	00
“ “ “ “ 1859,			5,554	00
“ “ “ “ 1860,			3,287	51
“ “ “ “ 1861,			<u>10,618</u>	11

			154,188	52
<i>Amount carried forward,</i>			<u>\$5,580,860</u>	64

<i>Amount brought forward,</i>		\$ 5,580,860 64
Sundry payments by the City,	65,758 02	
Discount and interest on loans,	<u>3,616,537 63</u>	
		<u>3,682,295 65</u>
		9,263,156 29
Sundry credits by the City,	58,907 79	
Amount received for water rates,	<u>3,079,927 86</u>	
		<u>3,138,835 65</u>
		<u>\$ 6,124,320 64</u>

SAMUEL N. DYER,

Clerk Cochituate Water Board.

REPORT OF THE SUPERINTENDENT OF THE EASTERN DIVISION.

BOSTON, January 5, 1862.

EBENEZER JOHNSON, ESQ., *Pres. of the Cochituate Water Board:*

SIR: In compliance to the Rules and Regulations of the Water Board, I present the Annual Report of the general condition of matters connected with the Eastern Division. There has not been the usual number of pipes laid the past year, owing to the small amount of building that has been going on. There has also been less call for the extension of the main and service pipes. The repairs for the past season have been more than usual. Having time to attend to it, all of the small matters that have been deferred have been brought up and put in good condition. Among the most important repairs were those at Chelsea Creek. Upon examination in the spring, it was found that the worms had destroyed the woodwork that supported the pipe, to such an extent that immediate repairs were required. Piles were driven by the side of the old ones, and sawed off low enough to put in timber 12×12 as caps, and then wedged up to the pipes, and properly secured. The old bearings were not disturbed. A new plank box has been built on both sides of the creek, and additional piles have been driven to protect it from vessels and the ice. At the Warren Bridge the outside fender was so much decayed as to be unsafe, and a new one has been put on the entire length of the bridge, together with new piles and braces to make it perfectly secure.

Reservoirs.

Repairs on the Beacon Hill Reservoir were commenced this fall. Not being able to procure suitable cement, it has been postponed until spring. A very favorable result was shown by the work done on it. The reservoirs at South and East Boston remain the same as they were last year. A drain has been laid on Brooks Street to take the waste water from the banks of the East Boston Reservoir. An average of sixteen feet of water is kept there, that being as much as is prudent to retain. The water is confined in the three reservoirs at the present time as a reserve in case of accident to the pipes, or an extensive fire.

Everything connected with this division of the works is in good condition, so far as it is possible to know.

Statement of Location, Size, and Number of Pipes laid in 1861.

IN WHAT STREETS.	BETWEEN WHAT STREETS.	Diameter of pipe in inches.	Feet of pipe.	REMARKS.
BOSTON PROPER.				
Berkley.....	Tremont and	12	430	
	Total 12 inches in Boston		430	
Rutland	West of Tremont	6	612	
Sharon	Harrison Avenue and Albany.....	6	672	
Public Garden.....	From Beacon	6	550	
Newbury	Arlington and Berkley.....	6	320	
Montgomery	West of Tremont	6	87	
Charles	Cambridge and Fruit.....	6	224	
Jay	Berkley and	6	600	
Fruit	North Grove and Charles.....	6	328	
Albion.....	Dover and Chapman	6	300	This was renewed.
	Total 6 inches in Boston		3,693	
Camden Place	East of Washington	4	255	
Walnut Place.....	East of Washington	4	255	
Tennyson Street.....	West of Church.....	4	18	
Public Garden.....	For Fountains	4	217	
Public Garden.....	From Arlington.....	4	104	
Worcester	From Harrison Avenue.....	4	300	For Hospital.
	For 20 Fire Reservoirs.....	4	252	
	Total 4 inches in Boston		1,401	
SOUTH BOSTON.				
Sixth.....	C and D.....	6	275	
First	O and P.....	6	331	
Second	K and L.....	6	72	
	Amount carried forward.....		678	

Statement of Pipes, continued.

IN WHAT STREETS.	BETWEEN WHAT STREETS.	Diameter of pipe in inches.	Feet of pipe.	REMARKS.
SOUTH BOSTON.				
	<i>Amount brought forward.....</i>	6	678	
O	Fourth and Sixth.....	6	482	
N	Fourth and Fifth.....	6	136	
James	Fourth and Thomas.....	6	118	
K	Second and Third.....	6	319	
Third.....	K and L.....	6	673	
E	First and Second.....	6	150	
Eighth	G and I	6	272	
Dorchester Avenue..	Dorchester St. and Dorchester Line,	6	820	
	Total 6 inches in South Boston,		3,648	
Tudor	C and D.....	4	267	For Crystal Gl. Co.
First	O and P.....	4	178	
Tudor	D and E.....	4	154	
Glover Court.....	From Ward Street.....	4	45	
	Total 4 inches in South Boston,		644	
EAST BOSTON.				
Border	Sturtevant's Wharf.....	4	150	For Eastern R. R.
Marginal	Eastern Railroad Wharf.....	4	550	
	For 4 Fire Reservoirs.....	4	53	
	Total 4 inches in East Boston..		753	

RECAPITULATION.

SECTION.	1861.	Diameter in inches.		
		12	6	4
Boston Proper.....	{ Total number of feet laid.....	430	3,693	1,401
	{ Stop-cocks in the same....		6	26
South Boston	{ Total number of feet laid.....		3,648	644
	{ Stop-cocks in the same....		11	3
East Boston	{ Total number of feet laid.....			753
	{ Stop-cocks in the same....			6
	Sums of Pipes.....	430	7,341	2,798
	Sums of Stop-cocks		17	35

Statement of the Length of different Sizes of Pipes laid, and the Number of Stop-cocks put in, to January 1, 1862.

DIAMETER OF PIPES IN INCHES.									
	40	36	30	24	20	16	12	6	4
AGGREGATE.									
Ft. of Pipe laid in Brookline, Rox'y, & Boston proper	23,082	19,991	29,096	5,773	.....	6,096	55,622	231,303	77,354
Number of Stop-cocks in the same.....	4	5	8	10	1	19	109	469	225
Feet of Pipe laid in and for South Boston.....	.....	.....	.....	.....	8,155	.....	18,730	86,656	23,519
Number of Stop-cocks in the same.....	.....	.....	.....	.....	4	.....	31	124	39
Feet of Pipe laid in and for East Boston.....	.....	.....	.....	.....	15,972	1,523	16,114	66,521	3,760
Number of Stop-cocks in the same.....	.....	.....	.....	.....	6	3	21	88	19
Feet of Pipe laid in Newton and Needham.....	.....	1,074	2,140	.....	.....	.....	159	.....	.....
Number of Stop-cocks in the same.....	.....	.....	.....	.....	.....	.....	2	1	.....
TOTALS.									
Length of Pipes laid.....	23,082	21,065	31,236	5,773	24,127	7,619	90,625	384,480	104,633
Number of Stop-cocks put in.....	4	5	8	10	11	22	163	682	283
									1,188
									693,240 feet, equal to 131 miles, 1,560 feet.

1,782 feet of 6-inch pipe has been discontinued on Beacon Street, and the service pipes connected with the 12-inch pipe that was laid in the winter of 1860; also 300 feet of 6-inch pipe has been renewed on Albion Street, between Dover and Chapman Streets, and the service pipes for the houses have all been renewed, using 270 feet of 5-8-inch lead pipe.

Statement of Service Pipes laid in 1861.

Diam. in inches.	Boston Proper.		South Boston.		East Boston.		Total.	
	Number.	Length in Feet.	Number.	Length in Feet.	Number.	Length in Feet.	Number.	Length in Feet.
1.....	8	370	2	246	1	6	11	622
$\frac{1}{2}$	7	370	2	111	1	51	8	532
$\frac{3}{4}$	284	10,337	136	3,935	45	1,649	465	15,921
1 $\frac{1}{2}$	21	672	89	2,628	13	433	123	3,733
Aggregate.....							607	20,508
Making the total number up to January 1, 1862.....							23,852	

Repairs of Pipes during the Year 1861.

DIAMETER OF PIPES IN INCHES.

WHERE.	40	36	30	24	20	16	12	6	4	2	1 $\frac{1}{2}$	1	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{5}{8}$	Total
Boston Proper.	4	4	2	....	4	2	9	35	28	25	47	15	3	1	240	419
South Boston..	....	....	....	....	....	....	2	4	1	....	....	6	....	....	44	57
East Boston...	....	....	1	....	5	1	3	1	3	1	....	....	1	....	16	32
Totals	4	4	3	....	9	3	14	40	32	26	47	21	4	1	300	508

Of leaks that have occurred in pipes of four inches in diameter and upwards, eighty-five were caused by the loosening of lead in the joints, seven by defective pipes, seven by defective stop-cocks, eight by settling of earth, two by frost. Total, one hundred and nine in pipes of four inches and upwards.

Of the leaks that have occurred in service and two-inch pipes, are as follows: One hundred and twenty-two were caused by the settling of earth, thirty-eight by stiff connections, nineteen stopped by rust, twenty by frost, forty-one by defective pipes, twenty-six by defective couplings, sixty-four stopped by fish, fifteen by defective cocks, eleven gnawed by rats, twelve struck by picks,

fourteen defective joints, nine by digging drains, four stopped by gasket, three by cocks blowing out, one by tenants. Total, three hundred and ninety-nine, in service and two-inch pipes, showing a decrease in the whole number of leaks for the past year of eighty-four.

Statement of the Number of Leaks, 1850-1861.

YEAR.	LEAKS IN PIPES OF A DIAMETER OF		
	Four inches and upwards.	Less than four inches.	Total.
1850	32	72	104
1851	64	173	237
1852	82	241	323
1853	85	260	345
1854	74	280	354
1855	75	219	294
1856	75	232	307
1857	85	278	363
1858	77	324	401
1859	82	449	531
1860	134	458	592
1861	109	399	508

Hydrants.

During the year thirty-six new hydrants have been established, as follows: Fifteen in the City proper, fourteen in South Boston, four in East Boston, and three in Roxbury.

Total number of hydrants established up to January 1st, 1862:—

In Boston Proper	938
“ South Boston	301
“ East Boston	179
“ Brookline	3
“ Roxbury	12
“ Charlestown	11
“ Chelsea	7
Total	1,451

Seventy hydrants have been taken out for repairs, and replaced by new or repaired ones. One hundred and twenty-nine hydrant boxes have been renewed. Two important hydrants at South Boston, (corner of 4th and A Streets, and 4th and D Streets,) that was taken from the 12-inch stop-cocks, have been changed, so as to come direct from the pipes, thus doing away with the necessity of shutting off the 20-inch main line on 4th Street, to make any repairs on them.

The hydrant in May Place has been taken out at the request of the owner of the property where it was located. A change has been made in the hydrants, so as to adapt them to the Steam Fire Engines, as was recommended last year, and all the hydrants set in future will be of the improved pattern. In connection with the hydrants, additional precaution has been taken to insure an abundance of water in case of fire, by connecting the following Fire Reservoirs with the main pipes : —

Devonshire, corner of Franklin Street.

Franklin, “ “ Hawley “

State, “ “ Congress “

Southac, “ “ West Cedar Street.

Bowdoin Square.

Sudbury, opposite Adams Street.

Tremont Street, opposite Pemberton Square.

Tremont “ corner of School Street.

Tremont “ “ “ Park “

Washington, corner of Milk “

Washington, “ “ Franklin “

Washington, “ “ Avon Place.

Liberty Square “ “ Kilby Street.

Broad, “ “ State “

Batterymarch, “ “ Broad “

Clinton, “ “ Fulton “

South Market, opposite centre of Quincy Market.

Hanover Street, “ No. 96.

Haymarket Square, opposite No. 6.

Endicott, at the junction of Salem Street.

Maverick Square.

Liverpool, corner of Maverick Street.

Central Square.

Lexington Street, opposite Lexington Place.

Stop-Cocks.

The stop-cocks are all in order, and have been properly cleaned and oiled. Fifty-two new stop-cocks have been put in and covered by new boxes, and seventy-three stop-cock boxes have been renewed. There are some important lines that need additional stop-cocks put in. Not having them on hand it was deferred until next season.

The work at the shop has been delayed the past season by not having sufficient power to carry our machinery. This has been remedied by putting in a steam engine, suitable to carry all of the works, and we now shall now be enabled to build the stop-cocks and hydrants without any delay.

*Statement of Pipes and other Stock on hand, exclusive of Tools,
January 1, 1862.*

NUMBER OF	DIAMETER IN INCHES.										
	40	36	30	24	20	16	12	6	4	2	1½
Pipes.....	18	25	96	8	67	40	53	85	46	16	30
Blow-off Branches.....	2	....	2	....	....	....	....	....	....	....	....
Y Branches.....	....	....	1	....	....	1	2	5	....	....	....
3-Way Branches.....	9	2	5	....	....	6	5	14	5	16	....
4-Way Branches.....	....	....	2	....	....	1	5	5	....	....	....
Flange Pipes.....	2	6	3	3	4	....	4	7	3	....	....
Sleeves.....	6	1	9	3	2	5	1	6	38	5	....
Clamp Sleeves.....	....	4	6	2	....	2	2	2	16	....	....
Caps.....	2	2	4	....	1	2	12	13	15	....	....
Reducers.....	3	2	....	2	....	2	4	8	8	....	....
Bevel Hubs.....	....	....	....	....	....	....	....	7	7	....	....
Curved Pipes.....	1	2	10	1	4	3	1	6	....	....	....
Quarter Turns.....	....	....	....	....	2	....	6	7	3	5	....
Double Hubs.....	....	....	....	....	6	9	....	....	....	....	114
Offset Pipes.....	....	....	....	2	....	....	....	6	5	....	....
Stop-Cocks.....	1	3	1	2	2	3	2	*	8	4	....
Yoke Pipes.....	....	....	....	....	....	....	4	5	....	....	....
Man-hole Pipes	2	....	2	....	....	....	....	....	....	....	....
Pieces of Pipes.....	1	6	4	3	7	3	9	13	3	....	....

*Twelve 6-inch Stop-cocks are now being made at the shop, and will soon be finished.

Hydrants.

Eighteen Wilmarth, eighteen Lowell, one sample, three New York patterns.

For Hydrants. 4 bends, 4 lengtheners, 14 frames and covers, 25 wharf hydrant couplings, 10 Nipples, 12 valve-seats, 43 caps, 41 stuffing boxes, 49 washers, 20 screws, 57 wastes, 7 wharf hydrant covers.

For Stop-cocks. 5 frames and covers, 1 36-inch valve, 19

clamps, 3 12-inch plungers, 3 6-inch do., 2 36-inch composition screws, 1 30-inch do., 2 24-inch do., 1 16-inch do., 1 12-inch do., 11 6-inch do., 15 6-inch iron do., 5 4-inch composition do., 44 bushings, 2 valve-rings, 5 sets of stands and gearing for 36 and 30-inch gates, 12 6-inch stop-cocks and 6 4-inch do., partly finished.

Meters. 2 3-inch iron Worthington pattern, 1 do. 3-inch composition do., 4 2-inch composition do., 71 1-inch do., 35 $\frac{5}{8}$ -inch do., 6 1-inch iron do., 6 $\frac{5}{8}$ -inch iron do., 1 1-inch, Scotch pattern, 6 $\frac{5}{8}$ -inch iron do., 44 of the Huse pattern, worthless except for old metal.

Stock for Meters. 10 1-inch connection couplings, 2 2-inch do., 7 clock covers, 93 lbs. composition castings, 14 lbs. rubber packing, 8 1-inch nipples, 4 sheets packing paper.

For Service Pipe. 6 1-inch Union cocks, 37 $\frac{3}{4}$ -inch do., 109 $\frac{5}{8}$ -inch do., 98 $\frac{1}{2}$ -inch do., 13 1-inch air cocks, 13-inch T cocks, 23 $\frac{3}{4}$ -inch do., 28 $\frac{5}{8}$ -inch do., 6 2 $\frac{1}{4}$ -inch couplings, 8 1-inch do., 14 1 $\frac{1}{4}$ -inch do., 30 $\frac{3}{4}$ -inch do., 87 $\frac{5}{8}$ -inch straight cocks, 115 lbs. old Union cocks, 57 lbs. $\frac{5}{8}$ -inch Y cocks, 82 lbs. 1-inch Union cocks, 101 lbs. $\frac{1}{2}$ -inch do., 334 lbs. $\frac{5}{8}$ -inch do., 110 lbs. $\frac{3}{4}$ -inch do., unfinished, 407 lbs. cock-castings of various kinds, 112 flange cocks, 45 uprights, 30 extension do., 45 caps and boxes, 8 upright caps and flanges for inch cock.

Lead Pipe. 525 lbs. 2 $\frac{1}{2}$ -inch pipe, 1828 lbs. 1-inch do., 1854 lbs. $\frac{3}{4}$ -inch do., 6013 lbs. $\frac{5}{8}$ -inch do., 2768 lbs. $\frac{1}{2}$ -inch do., 105 lbs. block tin pipe, 121 lbs. $\frac{1}{4}$ -inch block tin pipe for thawing purposes.

Pig Lead. 4054 lbs. pig lead. 57 lbs. sheet lead.

Blacksmith's Shop. 2671 lbs. bar iron, 5826 lbs. pieces, 235 lbs. steel, 2800 lbs. scrap iron.

Carpenter's Shop. 900 feet spruce plank, 4 hydrant boxes, 4 stop-cock do., 9 hydrant boxes unfinished, 6 stop-cock do., 100 lbs. spikes and nails, 100 feet boards.

Stable. 3 horses, 3 sets of harnesses, 3 wagons, 1 sleigh,

1 chaise, 1 pung, 1500 lbs. English hay, 700 lbs, salt do., 800 lbs. straw, 15 bushels grain. The wagons are in a poor condition, and are not worth repairing in the spring.

Tools. One steam engine, 1 large hoisting crane, 1 boom derrick, 4 pair geared derricks, 2 pair shears with all the rigging for the same, tools for laying main and service pipes and for repairs of the same, 2 engine lathes, 1 Fox lathe, 1 hand lathe, 1 upright drilling machine, 2 grindstones, with the necessary amount of small tools to carry on the shop, also the usual tools of the Carpenter, Blacksmith and Plumber, also the office furniture, &c., 3 large street tool houses, 1 small do.

At Beacon Hill Reservoir. 1 large proving press, 5 swivel pipe patterns, 1 swing stage, capstan frame and levers, 1 large copper ball, 1 composition cylinder, 2 jets, 1 6-inch cylinder and 2 6-inch jets, 1 reducer and 2 sets of 12-inch plates, 2 4-inch do., 3 composition reel jets, 6 cast-iron jets, 1 drinking fountain, also all of the patterns belonging to this department, some of which are stored at the foundries where we obtain the castings.

Miscellaneous. 5 man-hole frames and covers, lot of old lumber, 7 large granite flagging stones, lot of old machinery from Marlboro', 98 tons paving gravel, 700 bricks, 5 casks Portland cement, 1 barrel rosin, half-cord wood, 3 tons coal, 3 bundles gasket, 6 kegs old bolts of various kinds, 3 tons old cast-iron, 75 lbs. rubber packing, 130 lbs. old composition, 100 lbs. cotton waste, $\frac{1}{2}$ barrel oil, 4 dozen lanterns, 14 heads for proving press, lot of old hose, 1 proving press for 36-inch pipe, 1 do. for small pipes.

No opportunity has occurred the past season to dispose of the old materials as was recommended last year, the present prices of old iron and composition would warrant the disposal of them as soon as possible.

Respectfully submitted.

ALBERT STANWOOD,
Superintendent Eastern Division B. W. W.

REPORT OF THE SUPERINTENDENT OF THE WESTERN DIVISION.

NATICK, *January 5, 1862.*

EBENEZER JOHNSON, ESQ., *Pres. of the Cochituate Water Board.*

SIR: In compliance with the Rules and Regulations of the Board, the Superintendent of the Western Division respectfully submits the following Report of the condition of the work in his Division:

The gate house, outlet dams, roads, culverts, and the grounds around the lake, are all in good condition.

Agreeably to your order, I have raised the lower dam, and strengthened the upper one; and have built a dam across Washburn's meadow, at the south end of the lake, to keep back the stagnant water.

About eleven hundred feet of slope wall has been laid, at places where it was most needed, to keep the banks of the lake from washing away; and I would recommend a continuation of this work to some extent another year, or the purchase of more land, in order to retain the five rods around the lake.

The embankments, culverts, waste-weirs, and bridges, connected with the aqueduct, have all been thoroughly repaired during the past year, and are now in good condition.

The seventh of last May, some person or persons, — thinking, perhaps, to obtain employment during part of the dull season, — attempted to make a breach in the aqueduct, about one hundred feet east of the east pipe chamber at Charles River. I immedi-

ately notified you, and, accompanied by the Mayor and members of the Water Board, you proceeded to make an examination of it, and ordered a strict watch to be kept on the whole line. I immediately employed men to guard it, and they were kept on duty until November 19th, when I was ordered by the Board to discontinue their services.

During the year I have several times thoroughly examined the interior of the aqueduct, and on one occasion was accompanied by members of the Board. In August last, the interior received a thorough cleansing throughout its whole extent, as is usual during each year; no new cracks were discovered, but some of the old ones appear to have enlarged. The crack at the clay-bank at Bennett's land, in Brighton, in particular, has shown the past season that it would not be safe to allow it to remain much longer without being repaired; but repairs are attended with great difficulty, as Brookline Reservoir is not large enough to keep the city supplied, while the water is shut off from the aqueduct. I was ordered by the Board to point these cracks this fall, so that any settling of the work would be discovered; but it has been impossible to shut off the water even for one day, it being so low in the lake it was necessary to have it running constantly through the aqueduct, to keep up the head at Brookline Reservoir.

Brookline Reservoir has received the usual amount of attention during the year. The grounds and walks have been kept in good condition, and it still continues to be a place of considerable attraction to the public generally.

Agreeably to your order, the work connecting Dudley Pond with the lake, has been commenced, and will be completed in a few weeks.

You will find annexed a schedule of the tools, &c., belonging to the city, and used in this division.

Respectfully submitted.

E. F. KNOWLTON,
Superintendent Western Division.

The following property is in charge of, and used by, the Superintendent of the Western Division :—

- 1 express wagon.
- 1 horse cart and harness.
- 3 boats and 4 oars.
- 77 wheelbarrows, and 1 handcart.
- 113 shovels, and 24 picks.
- 2 crowbars, and 2 pinchbars.
- 4 iron rakes, 2 rammers.
- 2 grindstones, 8 water pails.
- 6 pairs rubber boots.
- 8 lanterns, 2 aqueduct lamps.
- 2 hammers, 1 level.
- 1 hand saw, 2 grass hooks.
- 2 iron wrenches at gate house.
- 2 brick and 2 pointing trowels.
- 2 hoes, 4 axes, 1 hand axe.
- 32 old shovels, 12 old wheelbarrows.
- 1 fluid can and oil filler.
- 1 pair hedge shears, 1 bush scythe, and 1 scythe snaith.
- 15 hundred feet plank.
- 1 stove and 1 desk.

WATER REGISTRAR'S REPORT.

OFFICE OF WATER REGISTRAR, CITY HALL.

BOSTON, *January 1, 1862.*

E. JOHNSON, ESQ., *President of the Cochituate Water Board.*

Sir: The following Report is made in obedience to the ordinance regulating this department, passed October 31, 1850:

The total number of water takers, now entered for the year 1862, is 25,486, being an increase since January 1, 1860, of 1,170.

During the year there has been 980 cases where the water has been shut off, all of which were for non-payment of water rates.

The total number of cases where the water has been turned on, is 1,336. Of these, 686 were cases which had been shut off for non-payment of water rates, and 650 were turned on for the first time.

The total amount received from December 31, 1860,

to January 1, 1862, is \$ 365,323 46

Of the above, there was received for water used in previous years, the sum of \$18,184.71, leaving the receipts for water used during the year 1861, the sum of \$347,138.75. In addition to the above, there has been received for letting on the water, in cases where it had been turned off for non-payment of rates, the sum of

1,431 50

Total amount \$ 366,754 96

The increased amount of income in 1861, over the previous year, is	\$ 30,694 60
The amount of assessments now made for the present year, is	\$ 298,755 19
The estimated amount of income from the sales of water during the year 1862, is	\$ 375,000 00
The expenditures of my department during the year 1861, have been	<u>\$ 3,776 40</u>

The items of this expenditure are as follows :—

Paid Chas. L. Bancroft for services as clerk, . . .	\$ 900 00
“ Stephen Badlam “ “ “ “ . . .	900 00
“ Chas. C. Badlam “ “ “ inspector, . . .	769 00
“ Edwin Jennings “ “ “ “ . . .	525 00
“ Chas. E. Dunham “ “ “ “ . . .	257 50
“ Farwell & Co., for printing	200 75
“ J. L. Fairbanks for stationery	130 15
“ William Souther, for distributing bills . . .	30 00
“ E. G. Richardson “ “ “ . . .	28 00
“ G. S. Carpenter “ “ “ . . .	28 00
“ Mr. Lyon “ “ “ . . .	8 00
	<u>\$ 3,776 40</u>

Statement showing the number of houses, stores, steam engines, &c., in the city of Boston, supplied with Cochituate water to the 1st of January, 1862, with the amount of water rates paid for 1861.

18,130 Dwelling Houses,	\$ 211,346 44
14 Boarding, “	806 00
103 Model, “	4,011 50
8 Lodging, “	169 00
34 Hotels,	3,480 00
3,842 Stores and Shops,	32,118 46
189 Buildings,	7,173 08
285 Offices,	2,007 92
<i>Amount carried forward,</i>	<u>\$ 261,112 40</u>

<i>Amount brought forward,</i>		\$ 261,112 40
49 Printing Offices,		635 55
18 Banks,		221 42
25 Halls,		328 00
3 Theatres,		151 25
17 Private Schools,		177 33
1 Library,		9 00
5 Asylums,		286 13
4 Green Houses,		37 00
1 Hospital,		226 26
1 Catholic College,		159 00
1 Medical College,		51 00
59 Churches,		447 08
7 Markets,		544 50
161 Cellars,		981 50
388 Restaurants and Saloons,		4,692 15
8 Club Houses,		183 00
7 Bath Houses,		345 00
12 Packing Houses,		219 50
822 Stables,		10,165 77
9 Factories,		232 50
8 Breweries,		209 67
2 Bleacheries,		20 50
59 Bakeries,		470 50
6 Ship Yards,		90 00
1 Dry Dock,		15 00
2 Dry Docks and Engines,		60 00
74 Shops and Engines,		6,085 63
8 Mills and Engines,		1,099 60
10 Foundries and Engines,		665 17
13 Factories and Engines,		2,159 66
11 Printing and Engines,		854 60
3 Bakeries and Engines,		180 40
3 Ship Yards and Engines,		125 00
8 Buildings and Engines,		1,013 87
<i>Amount carried forward,</i>		<u>\$ 294,254 94</u>

<i>Amount brought forward,</i>		\$ 294,254 94
26 Engines,	.	1,261 40
1 Aquarial Garden,	.	65 00
1 Laundry,	.	25 00
1 Pottery,	.	35 00
3 Armories,	.	55 50
1 Gymnasium,	.	24 50
29 Fountains,	.	162 50
663 Hose,	.	2,020 00
2 Gas Light Companies,	.	815 15
1 Mill Dam Company,	.	300 00
1 State House,	.	134 50
1 Massachusetts State Prison,	.	817 74
1 McLean Asylum,	.	205 00
1 Marine Hospital,	.	189 00
3 Ferry Companies,	.	2,393 68
39 Steamboats,	.	5,523 92
3 Railroad Companies,	.	760 00
1 House, (Vine St., City),	.	7 00
2 Offices, (Niles Block),	.	42 00
1 Office, (City Scales),	.	9 00
6 Fire Alarm Motors,	.	65 00
20 Engines, Hoses, & Hook & Ladder Houses,	.	365 00
266 Public Schools,	.	1,836 00
8 Police Stations,	.	447 00
2 City Stables,	.	112 50
1 Offal Station,	.	150 00
1 Steamer, Henry Morrison,	.	192 56
1 Court House,	.	250 00
1 Probate Building,	.	40 00
1 Dead House,	.	10 00
1 House of Correction,	.	462 00
1 Jail for Suffolk County,	.	243 00
1 Lunatic Hospital,	.	225 00
1 Public Library,	.	50 00
<i>Amount carried forward,</i>		\$ 313,548 89

<i>Amount brought forward,</i>	\$ 313,548 89
1 Faneuil Hall,	40 00
1 City Hall,	50 00
1 City Building,	37 50
Common Sewer Dept., (making mortar),	75 00
Urinals, &c., F. H. Market,	70 00
Contractors for Supplying Shipping, .	3,709 25
Street Sprinkling,	410 00
Skating Purposes,	75 00
Building Purposes,	1,374 33
Filling Tanks, (Navy Yard),	250 00
Custom House,	156 00
Measured Water,	27,342 78
	<hr/>
	\$ 347,138 75

Statement showing the Number and Sizes of Water Metres now in use, and where applied, to January 1, 1862.

	SIZES OF METERS.			
	$\frac{3}{4}$ inch	1 inch	2 inch	3 inch
Revere House		3		
Parker House		4		
American House		2		
Adams House	2			
Coolidge House		4		
Marlboro' House		1		
Tremont House		4		
United States Hotel		3		
Winthrop House		2		
Bromfield House	1			
City Hotel	2			
Sailors' Home	1			
Mariners' House	1			
Pearl Street House		1		
Boston Hotel	1			
Young's Hotel		2		
New England House		1		
Hotel de Pelham	2	1		
I. Adams (boarding house)	1			
Boston Sugar Refinery				1
South Boston Sugar Refinery			2	
Boston and Worcester Railroad Company		2		
Boston and Maine Railroad Company	1	1	1	
Old Colony Railroad Company		2		
Fitchburg Railroad Company		1		
Eastern Railroad Company		4		
South Boston Gas Company	1			
East Boston Gas Company		1		
Norway Iron Company, wire manufactory		2		
J. Trull & Co., distillery		1		
J. M. Barnard, distillery		1		
S. Bowman, distillery		2		
Bay State Rolling Mill		1		
Hodges & Sillsbee, distillery	1			
Henry N. Hooper & Co., foundry		1		
Luther Felton, distillery		1		
<i>Amounts carried forward,</i>	14	48	3	1

	$\frac{3}{8}$ inch	1 inch	2 inch	3 inch
<i>Amounts brought forward,</i>	14	48	3	1
Henry Souther, brewery		1		
Oriental Oil Company		1		
William Carleton, lamp manufactory	3			
Millitt & Smith, sugar house		1		
Boston Crystal Glass Company, glass manufactory,	1			
Boston Gasometer (Charles Street)		1		
Dexter, Lambert & Co., tassel factory		1		
Sanborn, Richardson & Co., pipe manufactory	1			
Grover, Baker & Co., sewing machines		2		
Lee, Woodman & Co., oil mill	1	2		
Graves & Hoyt, distillery	1	1		
Cunard Steamship Company				1
J. H. Hazleton, paper manufactory	1			
Chelsea Ferry Company				1
East Boston Ferry Company			1	
Chickering & Sons, piano manufactory		3		
Mount Washington Glass Works, glass manuf.		1		
American Grist Mill		1		
W. K. Lewis, pickle manufactory	1			
W. H. Davis, pickle manufactory	1			
J. B. Hamblen, pickle manufactory	1			
Stephen Jenny, distillery	1			
Stephen Jenny, oil factory	1			
Ambrose Louis, chemicals	1			
W. D. Philbrick, chemicals	1			
Shawmut Oil Company	1			
Downer Kerosene Oil Company			1	
Henry Howland, distillery		1		
John Felton, distillery		1		
Ketridge & Co., turpentine factory		1		
Total	30	66	5	3

The following table exhibits the yearly revenue received from the sales of Cochituate water, since its introduction into the city, October 25, 1848 :—

From October 25, 1848, to January 1, 1850 . . .	\$ 72,043 20
“ January 1, 1850, “ “ 1851 . . .	98,367 90
“ “ 1851, “ “ 1852 . . .	161,299 72
“ “ 1852, “ “ 1853 . . .	179,486 25
“ “ 1853, “ “ 1854 . . .	196,352 32
“ “ 1854, “ “ 1855 . . .	217,007 51
“ “ 1855, “ “ 1856 . . .	266,302 77
“ “ 1856, “ “ 1857 . . .	282,651 84
“ “ 1857, “ “ 1858 . . .	289,328 83
“ “ 1858, “ “ 1859 . . .	302,409 73
“ “ 1859, “ “ 1860 . . .	314,808 97
“ “ 1860, “ “ 1861 . . .	334,544 86
“ “ 1861, “ “ 1862 . . .	365,323 46
	<hr/>
	\$ 3,079,927 36

Statement showing the Number and Kind of Water Fixtures contained within the Premises of Water-takers in the City of Boston, to January 1, 1862, as compared with 1853.

1853	1861	
3,968	4,680	Taps; these have no connection with any sewer.
19,287	34,503	Sinks.
3,149	12,046	Wash-hand basins.
1,838	6,373	Bathing-tubs.
1,622	4,831	Pan water-closets.
698	6,373	Hopper water-closets.
159	256	Self-acting water-closets.
218	1,383	Urinals.
476	3,868	Wash tubs. These are permanently attached to the building.
14	13	Shower-baths. These are in houses where there is no tub.
9	10	Hydraulic rams.
312	709	Private hydrants.
	171	Stop-hoppers.
31,750	75,216	Total.

Respectfully submitted.

WILLIAM F. DAVIS, *Water Registrar.*

CITY ENGINEER'S REPORT.

OFFICE OF CITY ENGINEER, BOSTON, January, 1862.

EBENEZER JOHNSON, ESQ., *Pres't of the Cochituate Water Board:*

SIR: I submit the following Report of matters connected with the Water Works: —

LAKE COCHITUATE.

High-water mark in the lake is ten feet above Knight's old flume.

On the first of January, 1861, the water in the lake stood at eight feet four inches above the flume. It kept gradually rising until the middle of February, when it stood at extreme high-water mark, — that being as high as the water ever was in the lake. It stood at this height one week, after which it fell down to nine feet nine inches. On the ninth of March it again rose to ten feet above the flume, and from this time until the twelfth of May it stood clear up to high-water mark in the lake with the exception of only eight days; and in those eight days it was at no time more than four inches below high-water mark.

Since the twelfth of May the water in the lake has been gradually falling, and on the first of January, 1862, it had fallen seven feet eleven inches below *high-water* mark, leaving only two feet and one inch depth of water in the lake above *low-water* mark.

The daily average quantity of water brought to the city during

the past year has been 951,000 gallons over and above the daily average quantity of water brought in in 1860.

It will be seen by the above statement that in the early part of the year there was an ample quantity of water in the lake, owing to the fact that large quantities of rain and snow fell in the latter part of 1860 and early in 1861.

The lake being full, and the falls of rain and snow being heavy, made it necessary to allow the surplus amount of water to waste from the lake into Sudbury River. The amounts thus wasted were, in

January	40,277,184 gallons.
February	1,129,034,368 "
March	623,304,033 "
April	1,197,621,508 "
May	373,844,763 "
June	12,587,070 "
July	890,040 "
Total amount wasted	<u>3,377,558,966 gallons.</u>

Making an average daily waste for each of the three hundred and sixty-five days in the year of 9,253,586 gallons, nearly all of which we might now have on hand had we any place to store it in. The amounts shown above as having been wasted in July, June, and about ten millions of gallons of the amount in May, were lost because of leakages through the dam.

It will be seen by this, and by reference to previous reports, that there is a much larger amount of water falling at and around the lake, taking one year with another, than the lake can hold; and I now renew my advice given some years since, that the lake should be raised at least two more feet in height. Had it been raised four feet, as suggested by the City Engineer, at the time when it was raised but two feet, we should now have two feet more water in depth in the lake, and consequently should not now be short of water, nor should we be menaced with the danger of portions of the city suffering for the want of it, should the winter be a severe one.

As the consumption of water increases very fast, and as the lake supply will very soon all be used in the city, I most respectfully suggest that no time be lost in having the necessary surveys made to determine a new source of supply for the city, as recommended by the Mayor in his Inaugural Address of the present year.

Consumption of Water. Daily Average Number of Wine Gallons drawn from the Brookline Reservoir.

MONTHS.	1854	1855	1856	1857	1858	1859	1860	1861
January.....	10,695,200	9,702,700	12,669,000	15,089,000	12,160,000	14,512,000	17,862,000	21,106,769
February.....	10,654,200	10,349,800	12,791,000	14,175,000	14,399,000	14,769,000	18,901,000	20,804,131
March.....	9,582,100	10,125,600	12,504,000	13,941,000	14,154,000	14,480,000	15,409,000	19,453,344
April.....	8,738,500	8,540,000	10,800,000	12,454,000	13,465,000	13,760,000	14,621,000	17,151,593
May.....	9,685,300	9,103,800	10,378,000	12,414,000	11,423,000	11,302,000	14,790,000	16,687,832
June.....	11,745,200	9,984,400	11,223,000	12,504,000	10,867,000	11,639,000	17,838,000	17,231,984
July.....	10,613,800	11,056,600	13,167,000	13,551,000	13,621,000	13,219,000	17,239,000	18,897,809
August.....	10,028,100	11,120,800	12,664,000	13,077,000	13,141,000	12,704,000	19,297,000	18,272,365
September.....	9,712,400	11,710,800	11,522,000	12,030,000	12,745,000	12,389,000	17,957,000	18,098,259
October.....	8,769,800	10,771,200	11,891,000	10,864,000	12,969,000	12,026,000	16,938,000	17,987,128
November.....	8,030,200	10,383,200	11,691,000	11,372,000	12,143,000	12,715,000	16,862,000	16,604,076
December.....	10,597,600	11,307,200	13,284,000	11,241,000	13,075,000	14,586,000	19,151,000	15,976,362
Average for year..	9,902,000	10,346,300	12,048,600	12,726,000	12,847,000	13,175,000	17,238,000	18,189,304

Average Monthly Heights of Water in the Reservoirs at Brookline, Beacon Hill, South Boston, and East Boston,
1857 — 1861 inclusive.

MONTH.	BROOKLINE.					BEACON HILL.					SOUTH BOSTON.					EAST BOSTON.				
	1857	1858	1859	1860	1861	1857	1858	1859	1860	1861	1857	1858	1859	1860	1861	1857	1858	1859	1860	1861
January..	123.76	124.55	124.48	123.27	122.81	112.09	116.33	114.02	118.25	116.61	110.28	113.17	114.11	107.48	115.03	94.57	95.77	93.51	93.26	95.37
February	123.93	124.56	124.08	122.95	122.68	114.28	113.81	115.36	117.94	118.93	110.39	113.28	114.33	109.30	115.07	93.62	93.80	93.47	95.29	93.05
March. . .	123.94	124.37	124.48	123.88	123.32	114.10	114.27	116.61	119.89	119.05	110.53	113.28	114.60	109.40	115.12	94.03	93.75	93.88	94.80	94.00
April	124.15	124.66	122.62	123.77	124.01	115.51	117.10	116.99	119.83	118.91	110.76	113.05	114.69	109.34	115.32	96.00	95.99	98.97	93.84	98.07
May	124.11	124.49	124.43	123.13	124.04	114.22	117.70	117.01	117.70	119.06	111.24	112.67	114.35	111.90	113.83	93.48	94.85	94.79	96.66	97.85
June	124.37	124.54	124.22	123.26	123.68	114.47	116.40	115.65	116.69	117.32	111.05	86.70	113.88	113.17	112.58	95.37	93.60	93.98	96.29	96.22
July	124.36	125.65	124.65	122.99	122.68	114.18	115.36	115.30	116.13	116.48	110.45	114.12	113.62	113.36	110.91	93.53	92.91	93.48	95.53	95.00
August . .	123.93	124.56	124.13	122.78	123.71	114.00	114.81	114.82	115.70	114.18	110.35	113.85	112.38	110.97	112.92	93.99	96.88	93.41	96.99	97.34
Septem'r.	123.46	124.60	124.37	123.33	123.76	114.72	116.45	113.82	117.15	113.14	110.19	110.90	111.88	114.66	112.96	92.23	93.45	93.61	95.97	95.76
October..	124.40	124.41	124.29	123.59	123.79	116.21	116.59	114.76	115.34	115.91	107.58	111.46	111.38	113.49	114.68	91.47	94.05	93.97	96.97	95.56
Novem'r.	124.29	124.62	123.55	123.62	123.80	115.98	116.73	114.90	116.23	116.74	111.37	114.22	110.85	114.48	114.14	94.79	94.34	93.79	97.60	96.40
December	124.66	124.60	123.60	122.98	124.00	117.45	116.44	113.61	114.67	117.45	112.08	114.16	109.75	114.91	113.79	97.04	93.70	91.77	98.89	97.37
Average.	124.11	124.63	124.07	123.29	123.52	114.77	116.00	115.24	117.13	116.98	110.60	110.91	112.98	111.86	113.86	94.18	94.42	94.05	96.01	96.05

NOTE. — The above average heights are given in feet and parts, above marsh level. Maximum high water in the Brookline Reservoir is 124.6 feet above marsh level. By deducting the heights in the City Reservoirs from the heights in the Brookline Reservoir, in each month, we find the LOSS OF HEAD in the different sections of the city at that time.

Loss of Head from the Brookline Reservoir to Beacon Hill and East Boston Reservoirs.

The effect of increased consumption of water in the city may be seen by reference to the table in this and previous reports of *average annual heights of water in the reservoirs.*

A synopsis is given in the following table.

YEAR.	Average annual heights of Water above Marsh Level in			Loss of Head from Brookline to Beacon Hill Reservoir.	Loss of Head from Brookline to East Boston Reservoir.
	Brookline Reservoir.	Beacon Hill Reservoir.	East Boston Reservoir.		
1850	123.16	119.04	.....	4.12	.....
1851	123.36	119.39	105.06	3.97	18.30
1852	123.67	116.60	104.07	7.07	19.60
1853	122.86	114.89	104.91	7.97	17.95
1854	123.65	115.69	99.84	7.96	23.81
1855	123.82	117.79	97.49	6.03	26.33
1856	123.66	116.15	94.11	7.51	29.55
1857	124.11	114.77	94.18	9.34	29.93
1858	124.63	116.00	94.42	8.63	30.21
1859	124.07	115.24	94.05	8.83	30.02
1860	123.29	117.13	96.01	6.16	27.28
1861	123.52	116.98	96.05	6.54	27.47

Monthly Fall of Rain in Inches, in 1861.

MONTH.	PLACES AND OBSERVERS.					
	Lake Cochituate, by E. F. Knowlton.	Boston, by J. P. Hall.	Lowell, by Merrimack Manufacturing Co. J. B. Francis.	Lowell, by Locks and Canals Co. J. B. Francis.	Cambridge, by G. P. Bond.	Providence, by A. Caswell.
January.....	2.51	6.04	5.01	5.15	8.93	
February.....	3.81	3.57	2.89	2.53	2.79	
March.....	2.75	7.48	4.67	4.57	6.56	
April.....	6.44	5.89	4.52	4.39	5.89	
May.....	3.12	2.97	4.07	4.06	3.19	
June.....	2.64	3.64	1.84	1.94	2.56	
July.....	1.62	2.76	2.98	3.09	3.59	
August.....	7.79	6.04	5.12	4.77	5.57	
September.....	2.76	1.77	2.11	2.04	1.77	
October.....	3.20	2.66	3.67	3.79	2.68	
November.....	6.20	4.90	4.57	3.62	3.30	
December.....	2.60	2.35	1.87	3.00	3.31	
Totals.....	46.44	50.07	43.32	42.95	50.14	

NOTE. — Melted snow is, as usual, included in the above amounts of rainfall.

Conduit.

By a comparison of the following table of heights of water in the conduit with the similiar table in last year's report, it will be seen that there has been a much greater number of days this year during which there has been a large head of water on the conduit.

The table shows the different heights at which the water has been running, and the number of days in each month at the different heights.

The height of the conduit is six feet four inches:—

	HEIGHTS IN FEET AND INCHES.													
	These heights show a head on the Conduit.													
	0.0	6.0	6.2	6.4	6.6	6.10	7.1	7.4	7.6	7.8	8.0	8.2	8.6	9.0
	NUMBER OF DAYS IN EACH MONTH.													
January.....									3	16	7	4	1	....
February.....									3	....	18	....	4	3
March.....									27	....	4	....	
April.....									30	....			
May.....	1	....						7	23	....			
June.....									20	5	5	....	
July.....	2	....								29	....		
August.....	1	....								21	9	....	
September.....										30	....		
October.....						4	7	4	11	5	....		
November.....			8	1	8	13	....						
December.....		2	19	10	....								
	4	2	27	11	8	17	7	11	117	77	72	4	5	3

It will be seen by this table, that the conduit has been empty only four days during the year. It has been just full eleven

days ; less than full twenty-nine days ; and for 321 days it has been running with a head on it, varying from two inches to two feet eight inches.

Respectfully submitted.

JAMES SLADE, *City Engineer.*

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